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A novel e-commerce web portal: a student led co-creation case within an SME and a University of Applied Sciences

Uzun, Ali

Laurea Leppävaara

Laurea University of Applied Sciences
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Uzun Ali
Degree Programme in
Business Information Technology
Bachelor's Thesis
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Laurea University of Applied Sciences **Abstract**
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The purpose of this thesis project is to develop the required backend infrastructure for ShopThePlanet, a business-to-consumer e-commerce website, to fully function. The infrastructure is developed in corporation with a user interface development team. This project will also develop a site management tool which gives the ShopThePlanet administrators (or owner) the opportunity to be in complete control of the site content without requiring any IT skills. This is achieved through an administration panel where administrators can view, create, update, and delete the data which is used as website content.

Shoptheplanet.co.uk will be the first application completed under the company name Alpha Omega Marketing OY (TBC). Alpha Omega Marketing is owned by Mr. Francis Lynch, and an advisory board will be set up to assist in the initial growth of the company. Investment will be sought to further develop the company after initial company growth.

The project presented in this thesis based on theoretical research into best practices regarding how a website should be developed. The thesis also reports on the immediate implementation of the findings which were required since this is the main product of the company. In order to achieve this, an action research methodology was followed during the project implementation.

By the end of project I learned a new framework (ASP.NET MVC) and a server technology (ISS), extended my knowledge on C#, MySQL and HTML, improved my research skills, where my knowledge was insufficient I conducted research and successfully applied the findings into the project.

Even though all the thesis objectives are delivered and functionally the project was successful, it cannot be regarded as a successful project since the customer decided not to use the web service.

Key words: ShopThePlanet, e-commerce, ASP.NET, MVC, web service

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1 Introduction

Electronic commerce also known as e-commerce, is the function of buying goods and services through the Internet. In other words, e-commerce is the usage of electronic communications and digital information processing mediums in transactions to produce relationships for creating values among businesses, and between businesses and customers (Andam 2003, 6).

Nowadays for many people, e-Commerce is something they use on daily basis, online payment of bills, purchase of goods from Amazon or booking a plane ticket can be shown as examples of e-Commerce usage. e-Commerce first appeared 40 years ago and, till now, continually growing with latest innovations, technologies, and new start-ups joining the online market every year. Even though it is not older than two decades, today life without e-Commerce seems to be difficult (Andam 2003, 6).

In the UK, as an impact of the ease of accessing to computers with high broadband access, internet usage has increased rapidly in last 20 years. This increase can be observed not only over individuals but also over businesses which had a great effect on UK retailing, allowing them to buy their goods and sell their products to all over the world at any time, changing the old habits of buying goods and services completely (Internet shopping 2007).

Today there are millions of businesses and consumers using online shopping. Estimated sales volume of online shopping is as 2009 is £50bn (IMRG). The UK is currently the leader of the online sales in Western Europe followed by Germany and France. The growth in online retail sales in the UK is currently 10 times bigger than overall UK retail sales, and it's expected online retail will reach %20 of total retail sales by 2012 (Internet shopping 2007).

1.1 Background of the project

The project is executed within co-creation initiatives, a small medium enterprise named Alpha Omega Marketing OY(TBC) and Laurea University of Applied Sciences. I undertook a lead role in developing a novel e-commerce web portal named "ShopThePlanet", which is a business-to-consumer e-Commerce website. Assuming it is one of the latest members of this market; bringing a new approach by "selling" the other online shops as their product and defining their mission as "to find the best online shops the web has to offer and bring them to the entire planet". The website is based on an affiliate business model. (Lynch 2012. Personal communication.)

ShopThePlanetwebsite is designed to be accessible to virtually all areas of the market. Within the marketing plans the entire market will be divided into smaller more manageable segments to increase effectiveness of each marketing campaign: Country, gender, age group, marital status, customer product category preferences. This would give a well-defined segment to focus marketing activities. (Lynch 2012. Personal communication.)

1.2 Background of the company

Shoptheplanet.co.uk will be the first application completed under the company name Alpha Omega Marketing OY (TBC). Alpha Omega Marketing is owned by Mr. Francis Lynch, and an advisory board will be set up to assist in the initial growth of the company. Investment will be sought to further develop the company after initial company growth. (Lynch 2012. Personal communication.)

1.2.1 Business model

The website is based on an affiliate model where ShopThePlanet will be paid for actions (site users purchasing from the online store).

Figure 1: ShopThePlanet business model

1.2.2 Internationalization

The idea behind ShopThePlanet is to take a competitive advantage by representing online shops across geographical boundaries that many competitors still use. Whilst ShopThePlanet will initially be targeting a UK audience it will be representing shops from UK, US, Finland, Sweden, Germany and many other countries. True internationalization will occur when multiple languages are added to the site and market directly to many countries in their native languages. (Lynch 2012. Personal communication.)

1.3 Purpose of the project

The purpose of the ShopThePlanet is to create a working online shopping community where customers interact with the website and other customers with similar interests, giving control of the online shopping experience to the customer in order to create new customers for affiliate online stores and commissions for ShopThePlanet.

The purpose of this thesis project is to the required backend infrastructure for ShopThePlanet, a business-to-consumer e-Commerce website, to fully function. The infrastructure is developed in corporation with user interface development team. This project will also develop a site management tool which gives the ShopThePlanet administrators (or owner) the opportunity to be in complete control of the site content without requiring any IT skills. This is achieved through an administration panel where administrators can view, create, update, and delete the data which is used as website content. (Lynch 2012. Personal communication.)

1.4 Thesis problem

This project aims to provide solution to following main web business problems:

Filter system: As the site grows 1000's of shops will be represented on the site, the filter system needs to be able to reduce this down to manageable numbers for the user. Filters include Category, Sub-Category, Shop home country, Delivery countries, Shop Age, User ratings.

Shop details content: The site must provide all the information a user may need in order to as certain if they wish to visit the shop. This should include description, user comments, ratings, screenshots/pictures.

Content management – The administration / back end system needs to have easy functionality to control the large number of shops we will be representing. (Lynch 2012. Personal communication.)

1.5 ShopThePlanet Objectives

ShopThePlanet projects' purpose is to build the greatest selection of online shops from around the planet by finding the best shops available including the biggest, the smallest, themost diverse and the most niche.
The project also targets to promote all shops without geographical boundaries, continually advance the website and take advantage of modern techniques to provide the ultimate user experience.
The website's main functions are, providing the user with and an exceptional platform where they can easily find the shops most relevant and interesting to their preferences, developing social elements to allow users to interact with the social community at large and providing additional benefits for users including coupons, vouchers and competitions. (Lynch 2012. Personal communication.)

1.6 Research methodology

The project presented in this thesis based on theoretical research into best practices regarding how a website should be developed. The thesis also reports on the immediate implementation of the findings which were required since this is the main product of the company. In order to achieve this, an action research methodology was followed during the project implementation.

Action research can be described as "learning by doing" - defining a problem, take required action to resolve it, evaluate the results, and if it is not successful, try same process again.
A more succinct definition is,
"Action research aims to contribute both to the practical concerns of people in an immediate problematic situation and to further the goals of social science simultaneously. Thus, there is a dual commitment in action research to study a system and concurrently to collaborate with members of the system in changing it in what is together regarded as a desirable direction. Accomplishing this twin goal requires the active collaboration of researcher and client, and thus it stresses the importance of co-learning as a primary aspect of the research process". (Gilmore & Krantz & Ramirez , 161)

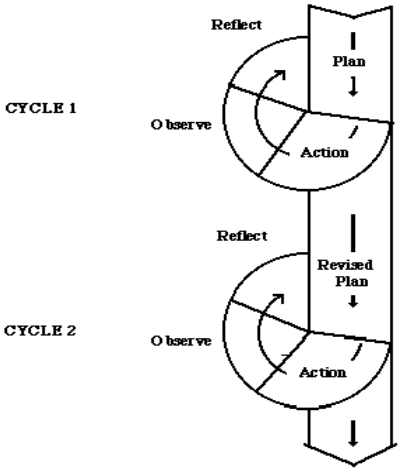

Figure 2: Simple Action Research Model

2 Theoretical background

There are certain elements in order to successfully develop an online shopping portal including hosting, data storage, and technologies to use for server-side development.

2.1 Hosting

First step of development is to decide how the application will be hosted. Since company does not have enough resources to host the application within company facilities, application will be hosted externally. Currently there are various categories of Web hosting available. (The Guide to Hosting Strategies for Web-enabling the Enterprise. 2000)
In general, hosting can be categorized as, virtual (shared) web hosting, co-location and dedicated web hosting.

Virtual web hosting plan is the most economic option in which space is shared by two or more business on the same server. Shared hosting is most suitable for the businesses that have a simple website. It offers satisfactory reliability and security which does not meet the requirements for a business critical, enterprise-class websites. These kinds of websites that use shared hosting need to apply additional security layers in order to protect critical information. Also lower bandwidth availability affects the website load time and responding to big number of user requests (The Guide to Hosting Strategies for Web-enabling the Enterprise. 2000).

Co-location is a web hosting option in which the businesssupplies the servers, but rents the space for data center, necessary connectivity and other required services from the Managed e-Business Service Provider (MeSP). This compelsenterprises to maintain control of their serv-

ers and website operations, while profiting the high-speed access,better security, environmental control offered by the hoster's data centers. This option is ideal for the companies which have the competence to manage their network operations or searching for a great control for their business-critical website's security.(The Guide to Hosting Strategies for Web-enabling the Enterprise 2000).

Dedicated web hosting is a web hosting plan in which single or multiple servers are reserved for the needs of one business or organization. Dedicated web servers offerextra security and consistencythat needed to hold the high transfer and the high bandwidth requirements of business-critical websites. For higher traffic websites, load balancing servers can be configured. Even enterprises choose to establish a simple website and virtual hosting should requesta full service hosting that has the capacity to handle dedicated web hosting (The Guide to Hosting Strategies for Web-enabling the Enterprise. 2000).

2.2 Data storage

After hosting next step is to decide how the raw data which is required for ShopThePlanet operations will be stored. In order to effectively manage the data, use of a computer database is required. A database is an integrated computer arrangement that stores a set of:

- Customer data, which is raw facts of importance to the customer.
- Metadata, which is used to integrate and manage the customer data.(Coronel, Morris & Rob 2011, 7)

2.2.1 Types of databases

Databases can be categorized according to their location, the number of users and purpose of their use.

Number of users: These types of databases are categorized as single or multiuser databases. Single user databases allow only one user at a time which means other users who are willing to use the database have to wait for first user to logout from the system. Multiuser databases allow multiple users at the same time. When a multiuser database supports less than 50 users or is designed for a specific department's use it is called workgroup database. When a multiuser database supports more than 50 or allows users companywide it is called enterprise database (Coronel, Morris & Rob 2011, 9).

Location: Location based databases are divided as centralized and distributed databases. Centralized database supports data from only one site on the other hand distributed database supports data from multiple sites from multiple locations (Coronel & Morris & Rob 2011, 9).

Purpose of use: Today most frequently used database classification is based on purpose of database's usage. When databases are used for enterprises' daily operations these type of database are called operational databases. Quite the reverse, data warehouses are the databases that are used to generate required information which will be needed to make strategic decisions (Coronel, Morris & Rob 2011, 9).

2.2.2 Database Management Systems

A database management system (DBMS) is software which is used for controlling database access and managing the structure of the database. The database is stored as a set of files andDBMS provides an interface between user and the database which is the only way to read the data inside these files (Coronel & Morris & Rob 2011, 7).

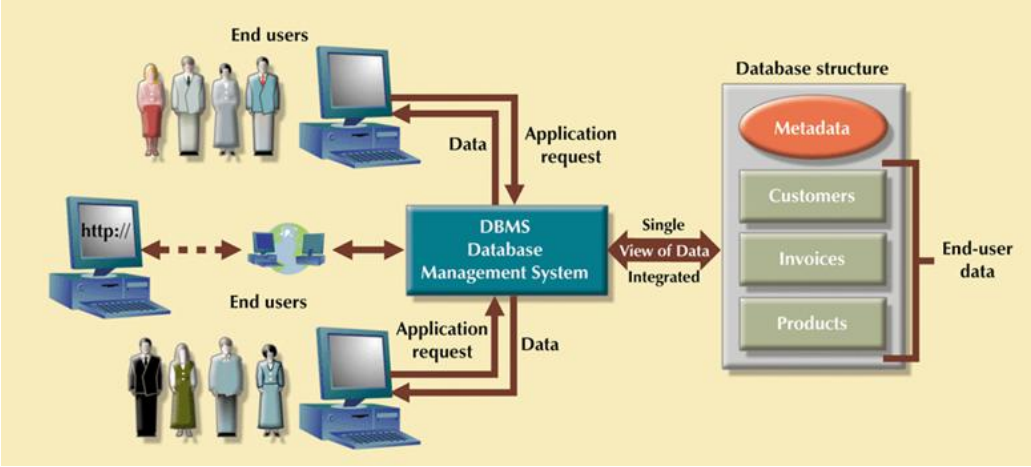

Figure 3: Database Management System

DBMS allows data to be shared among other users and applications. DBMS also combinesviews of the other users into one data repository. Information is derived from raw data; therefore it is essential to have an effective way to manage this data. DBMS helps to manage data effectively by offering:

- Better sharing of data by providing improved data access to the users
- Better securityby providing a framework for improved implementation of security policies.
- Better integration of data by offering wide access to successfully managed data which supports integrated organization view.
- Prevention of data inconsistency, which happens when different versions of the same data occurs, by carefully designing the database.
- Better data access by offering faster responses to ad hoc queries.

- Better decision making with improved data quality by combining successfully managed data and better access.
- Bettercustomer productivity by offering easier transformation of data to functional information.(Coronel, Morris & Rob 2011, 7-9)

2.3 Server-side technology

There are two types of web pages, static and dynamic. Static web pages have static content that is fixed by its developer during the process of development. Allcustomers visiting such web page will always display the same content unless developer updates the page. On the other hand, in a dynamic web page information on the page is formed dynamically according to user input, for instance through a filter form.All of the e-Commerce web pages are examples of dynamic web pages and most of the dynamic web pages require server side support. Server-side technology functionson a web server and forwards the results to the browser.Use of server-side technology classified as follows:

- To develop HTML based web pages
- To provide required data to a RIA (rich Internet application)
- To manage user input and forward itthrough email or renew the content of a database. (Powers 2010)

Whenserver-side technology used in combination with HTML, itconstructs the web page based on datareceived from the browser (user submits a form or clicks a link). It also interactswith the database to receive content of the page, and uses the outcome to form the HTML code ready to be forwarded to the web browser. (Powers 2010)

Server-side technology is also an essential part of the security of the system. By applying client–side data validation the data is checked before the database is queried. Client-side validation can be bypassed by disabling JavaScript from the browser but with carefully designed validation on the client-side this can be avoided. (Powers 2010)

The key point of using client-side technology is that all the processes that happen happen on the web server and the outcome is forwarded to the web browser. Any process that requires a database query always involves web server.(Powers 2010)

Currently there are several server-side technologies available. Most frequently used ones are as follows:

- Active Server Pages (ASP)

ASP, announced in 1997, is an old Microsoft server-side technology which is currently not supported due to company policy change after ASP 3.0 (Powers 2010).

- ASP.NET

ASP.NET launched by Microsoft as the substitute for classic ASP technology. It uses .NET framework and comes with integrated security, consistency and flexibility to develop applications through different programming languages such as C# and Vb.Net. Examples of websites using ASP.NET: bing.com, stackoverflow.com and MySpace.com (Powers 2010).

- Adobe ColdFusion

ColdFusion is Adobe's platform independent application server which is compatible with Mac OS X, Linux, and Windows. Java is used for background processes which is a powerful programming language. Advantage of using ColdFusion is that it uses a tag-based language CFML (ColdFusion Markup Language) which is similar to HTML which handles the complex programming and makes developers job easier (Powers 2010).

- JavaServer Pages (JSP)

Java Server Pages technology is designed to target highly-traffickedwebsites.Advantage of JSP is the code library which is known as servlets provides the opportunity to create applications with less coding. Vitaminshoppe.comand gamestop.com are examples of websites using JSP (Powers 2010).

- PHP

PHP is the most widely usedopen-source server-side technology which first appeared in 1995 with the name Personal Home Page Tools (PHP Tools), allowed users to access their web server. Today PHP stands for: Hypertext Preprocessor is a sophisticated programming language which is used by many famous web pages, including Wikipedia, Facebook, and Yahoo (Powers 2010).

- Python

Python is an open source technology, which is used by NASA, Google, YouTube and Yahoo, is a programming language with simple and clear syntax. It is a common component of most MAC OSx and Linux operating systems which also can be installed on Windows devices (Powers 2010).

3 Development plan

This section explains the stages and sub stages of development. Mainly ShopThePlanet project can be divided onto two logical divisions, backend and frontend. Backend also can be divided as data storage (database) and server. This thesis project only focuses on backend side of the ShopThePlanet.

3.1 Database design and implementation

3.1.1 Tables

The database that will provide the required data to ShopThePlanet web service consists of following tables:

a. Company Table
Stores basic data related to each online-shop.

b. Age_group Table
Defines the age groups that will be used for filtering.

c. Country Table
Defines the countries where a shop can offer shipment.

d. Currency Table
Defines valid currencies will be used for purchases.

e. Main_category Table
Defines valid main categories will be used for filtering.

f. Payment_method Table
Defines valid payment methods will be used for purchases.

g. Sub_category Table
Defines valid sub categories will be used for filtering.

h. Company_agegroup Table
Join table (m:n) where age groups for companies are defined.

i. Company_category Table
Join table (m:n) where main categories for companies are defined.

j. Company_currency Table

Join table (m:n) where currencies that companies used for purchases are defined.

k. Company_deliver_country Table

Join table (m:n) where countries that shops offers shipment are defined.

l. Company_payment_method Table

Join table (m:n) where countries that shops offers shipment are defined.

m. Company_category Table

Join table (m:n) where sub-categories for companies are defined.

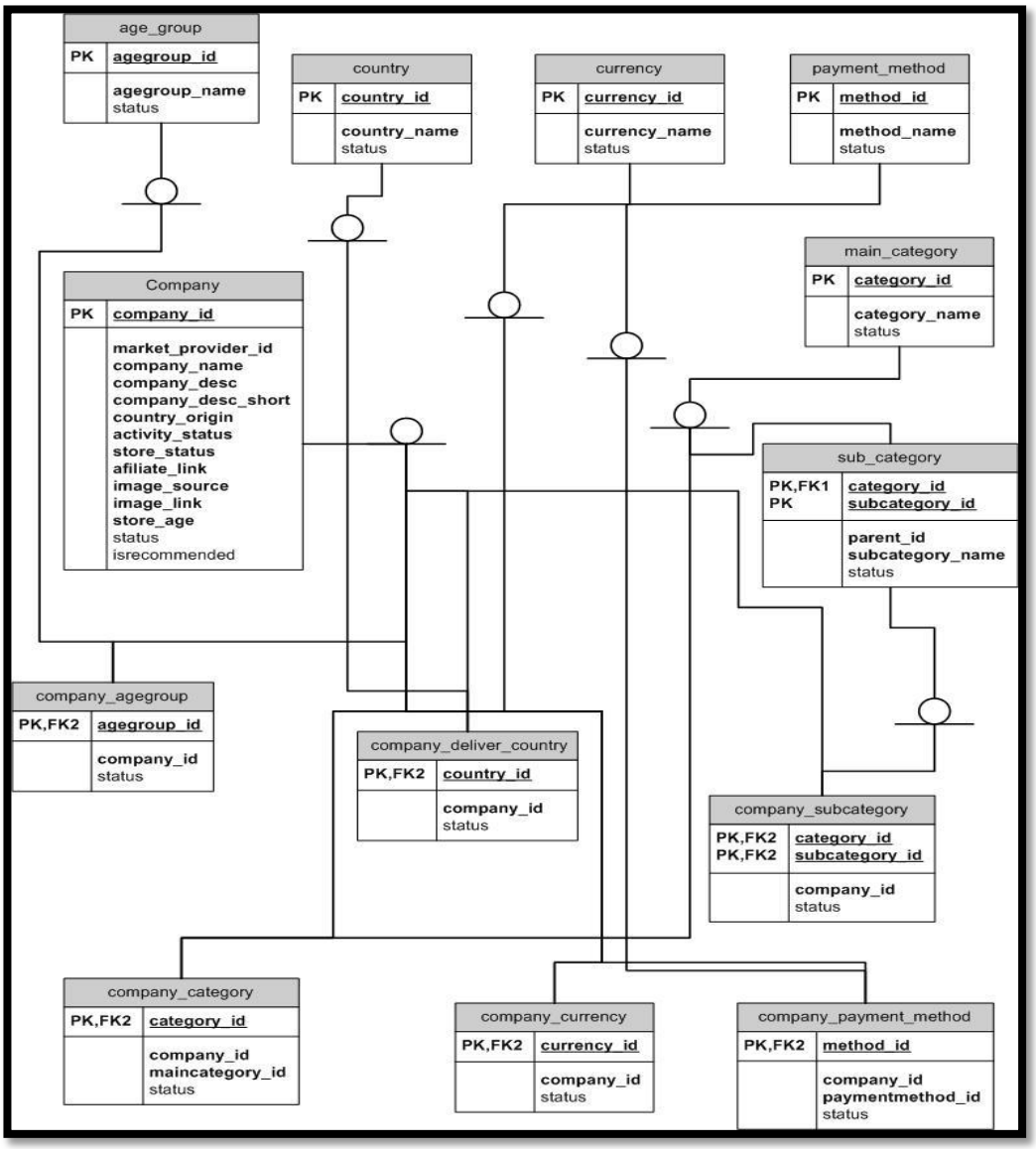

Figure 4: ShopThePlanet Database Design

3.1.2 Storage and management software

3.1.2.1 Storage - MySQL:

MySQL is one of the most used open source database in the world. It is consistent, has a high performance level and is easy to use. It is also used in latest applications which built on LAMP (Linux, Apache, MySQL, PHP / Perl / Python). Currently many of the world's biggest organizations built their service on MySQL. These companies include Google, Facebook, Alcatel Lucent, Zippos and Adobe. MySQL gives users to ultimate control by providing compatibility with over 20 platforms together with Windows, Linux, Mac OS, IBM AIX, and Solaris (MySQL 2013).

MySQL is most popular database in the world it is easy access to documents, tutorials, discussions, previously faced problems, receive support. On top of all development team's familiarity with MySQL syntax were the main reasons for selecting MySQL (MySQL 2013).

3.1.2.2 Management - phpMyAdmin:

phpMyAdmin is an open source software written in PHP. Purpose of this tool is to provide a web interface to its users in order to manage their MySQL databases. The most repeatedly used functions (administrating users, permissions, databases, tables, relations,fields, indexes, etc) are supported by the user interface. Also user can run SQL queries directly (phpMyAdmin 2012).

Using phpMyAdmin does not require knowledge on MySQL syntax or any programming language. Users are able to run operations easily by using the web interface. Good documentation and availability in 69 languages are the other reasons why phpMyAdmin was selected as the database management software for this project (phpMyAdmin 2012).

3.2 Server design and development

3.2.1 Technology stack

Server side of the ShopThePlanet will be developed using following technologies:

NAME	DESCRIPTION
ASP.NET	A combined Web development model that consists of the services necessary for building Web applications with a minimum level of coding. ASP.NET is part of the .NET Framework, therefore ASP.NET coders also have access to .NET libraries.
.NET 4	Microsoft's broad and consistent programming model for developing applications that have visually spectacular user experiences, faultless and protected communication, and the capability to model a variety of business processes.
Microsoft Visual Web Developer 2010	A free and powerful development environment for developing, testing and deploying Web applications various Microsoft Web Platform together with Internet Information Services, ASP.Net and SQL Server.
MySQL Community Server 5.5.29	MySQL is one of the most used open source database in the world. It is consistent, has a high performance level and is easy to use.
Windows Server 2008	Provides next generation web tools, built-in virtualization technologies, protection and server management improvements that will assist users to manage their IT operations, reduce expenses and improve performance of business-critical systems.
MVC ASP.Net 3.0	A framework for developing scalable, standards-based web applications using well-established design patterns and combination of the .NET Framework and ASP.NET.

Figure 5: ShopThePlanet technology stack

3.2.2 High level design

ShopThePlanet sytem consists of collection of services grouped into the following 5 main layers at the highest level:

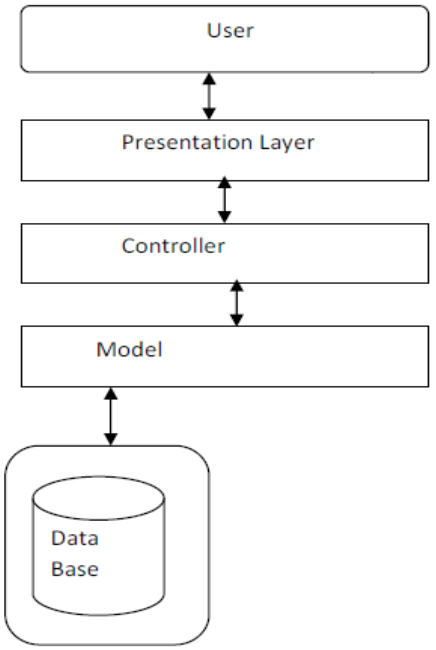

Figure 6: High level design of STP

Each layer includes a chain of components that implement the functionality for that layer. These components must be consistent and loosely coupled to reuse and preservation. Components that need to be implemented for each layer are shown in following figure:

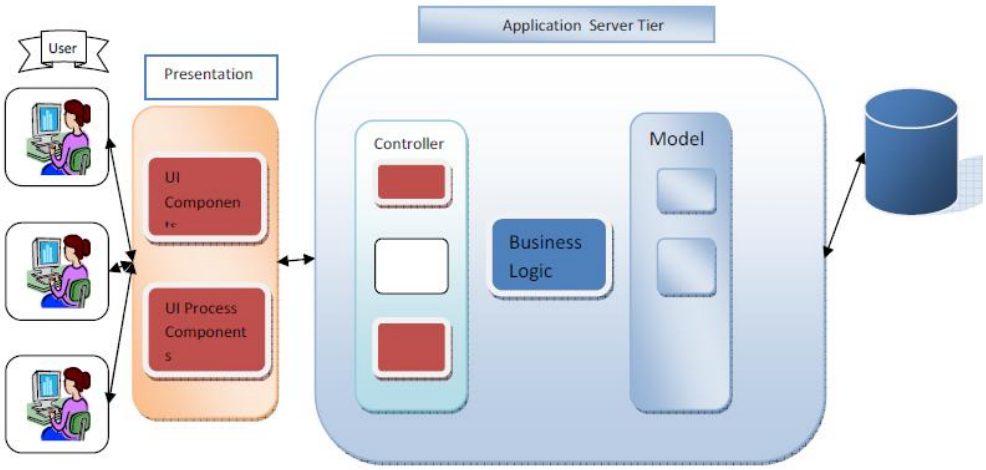

Figure 7: Components view of STP

ShopThePlanet web service follows the ASP.NET MVC framework that provides the following features:

- Application task separation, test-driven development and testing. Unit testing can be done without running controllers in an ASP.NET process on order to make unit testing fast and flexible. Any unit-testing framework that is compatible with .NET framework can be used.
- Allows plug-in and extensions. Framework components are designed so that they can be easily changed or modified. URLs can exclude file-name extensions, and are designed to support URL naming model that work for REST (representational state transfer) addressing and search engine optimization (SEO).
- ASP.NET MVC framework supports existing ASP.NET features. In-line expressions (<%= %>), nested master pages, declarative server controls, templates, data-binding, localization, and so on.

  ASP.NET MVC allows usage of forms verification and Windows verification, URL authorization, association and functions, output and data caching, session and profile state managing, the configuration system, health monitoring, and the provider architecture. (ASP.NET MVC Overview 2012)

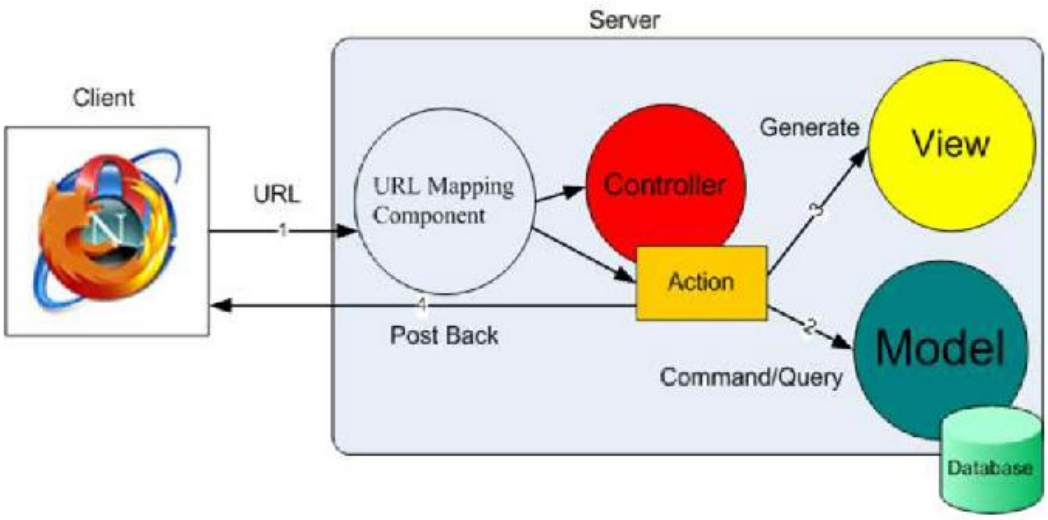

Figure 8: Structure of MVC model

3.2.2.1 Presentation Layer

Presentation layer components apply the functionality needed to allow users to interact with the application. This part of the application is provided by another development team (ASP.NET MVC Overview 2012).

3.2.2.2 Controller

MVC controllers' function is responding to incoming requests to an ASP.NET MVC website. Every request is mapped to a specific controller. The URL's are automatically mapped by the framework with clearly structured names ("/controller name/controller action/action parameters") to an action in that controller class and calls the action with the required parameters. For example: If you enter http://localhost/Company/Index/3 to your browser, "Company" controller class receives the request and runs the function "Index" with parameter "3". As response the controller might return a specific view back to the browser or the controller might forward the user to another controller (ASP.NET MVC Controller Overview 2012).

A controller interprets controller actions. An action is a function on a controller that invoked when a particular URL is entered in your browser address bar. For example: http://localhost/Product/Index/3.
A controller action has to be a public method of a controller class. C# methods are private by default. Any public method added to a controller class is interpreted as a controller action automatically.
A controller action method cannot be overloaded. Also, a static method cannot be a controller action. Besides these restrictions, any method can be used as a controller action.
A controller action responds to requests with an action result. The ASP.NET MVC framework allows use of different types of action results:

1. ViewResult – Result stands for HTML and markup.
2. EmptyResult – Result stands for no result.
3. RedirectResult – Result stands for forwarding to a new URL
4. JsonResult – Result stands for a JSON result which can be used in an AJAX application.
5. JavaScriptResult – Result stands for a JavaScript script.
6. ContentResult – Result stands for a plain text result.
7. FileContentResult – Result stands for a downloadable file with the binary content.
8. FilePathResult – Result stands for a downloadable file with a path.
9. FileStreamResult – Result stands for a downloadable file with a file stream.

All action results inherit from the base ActionResult class. (ASP.NET MVC Controller Overview 2012)

3.2.3 Model

Model objects are used for implementing the applications data domain logic. Often, model objects pull and save model state in a database. For example, a Company object might pull data from a database, work on it, and then write updated information back to a Company table in a database (ASP.NET MVC Overview 2012).

4 ShopThePlanet

In this part the functionality of the ShopThePlanet web service and the way it responds to project objectives will be explained.

4.1 Control panel

Figure 9: STP control panel main page

This panel is used for viewing, adding, editing the data which will be used as content of ShopThePlanet website giving administrator complete control of the content and the ability to manage their data without requiring SQL knowledge. The panel achieves content management objective by providing the required functionalities.

4.1.1 View data

Panel provides an interface between the database and user allowing user to view the data stored in each database.

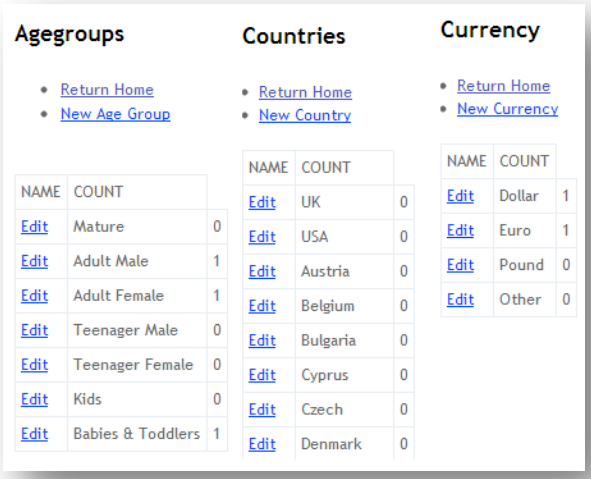

Figure 10: Control panel table view

4.1.2 Edit data

Administrator is also able to add new data and edit the existing data in database tables.

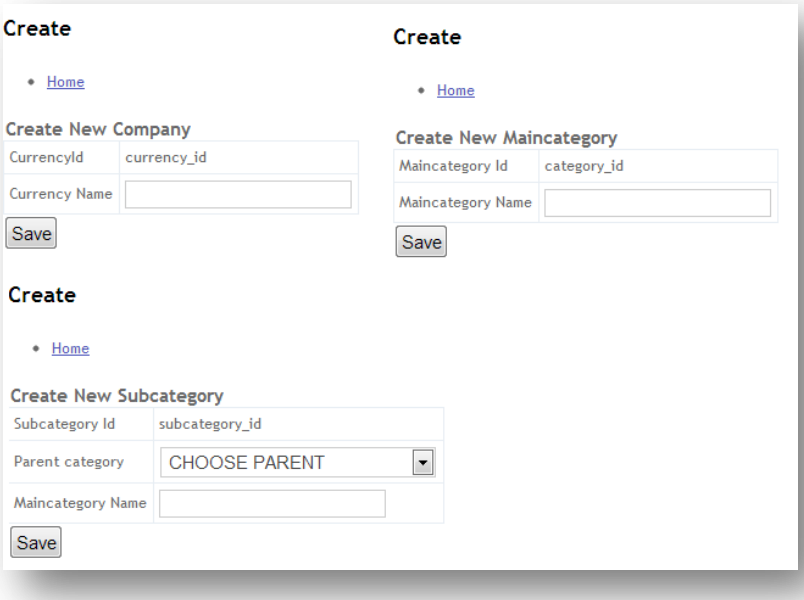

Figure 11: Adding data to tables

4.1.3 Register online shops to system

The core functionality of the content panel is to allow administrator to edit and register new online shops and add required details related to these shops which will be used categorizing shops. Registration is done in two parts:

I. Inserting basic data

In this part administrator inserts the basic data related to shop which later on will be the content of that company's page in real website. Required fields are as follows:

- Company id: Unique id of the shop.
- Company name: Name of the shop.
- Company description: Detailed description of the shop.
- Company short description: Short description of the shop.
- Image source: Provided by the partner (shop). Path to the image that will be used as shop picture.
- Image link: Provided by the partner (shop). URL that defines where the users will be rooted when they click on the image
- Market provider id: Provider id of the shop.
- Country: Country that shop is established.
- Activity status: Defines whether shop is active.
- Store status: Defines shops status within ShopThePlanet (e.g.: Gold, silver, bronze).

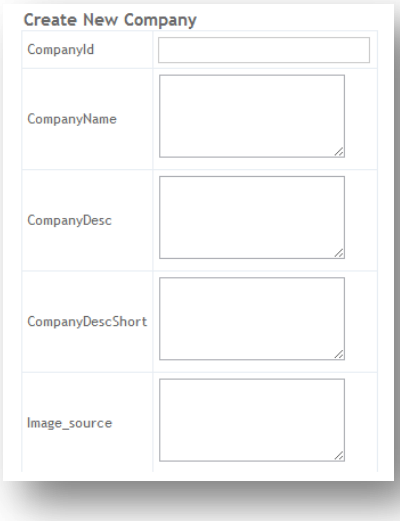

Figure 12: Insert basic shop data

II. In second part administrator defines the details -that will be used to categorizing - for the shop. Details are added by selecting matching values from the provided data sets. Required details are as follows:

- Age group: Defines target age groups of the shop.
- Currency: Defines which currencies are accepted for transactions.
- Payment methods: Payment methods that shop supports.
- Operating countries: Countries that shop offers its service.
- Other shop specific details: Market related details for the shop.

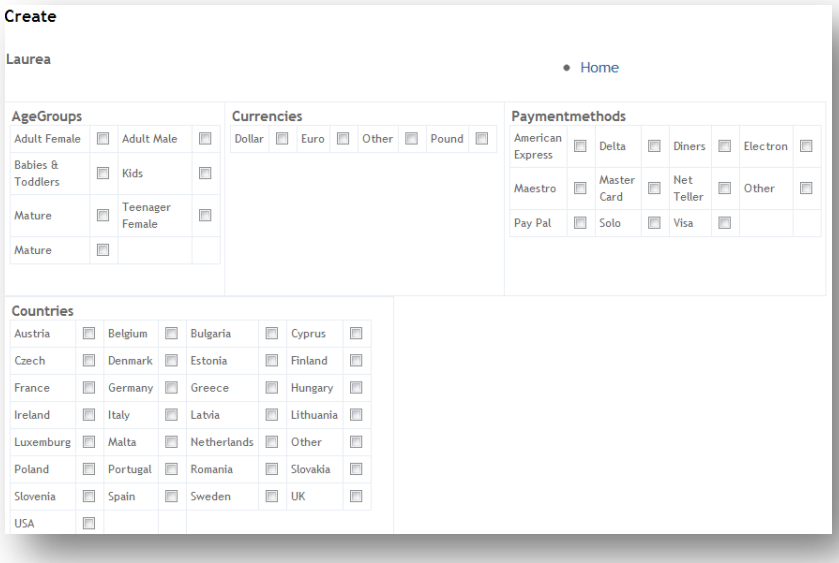

Figure 13: Add details for shop

4.2 Website

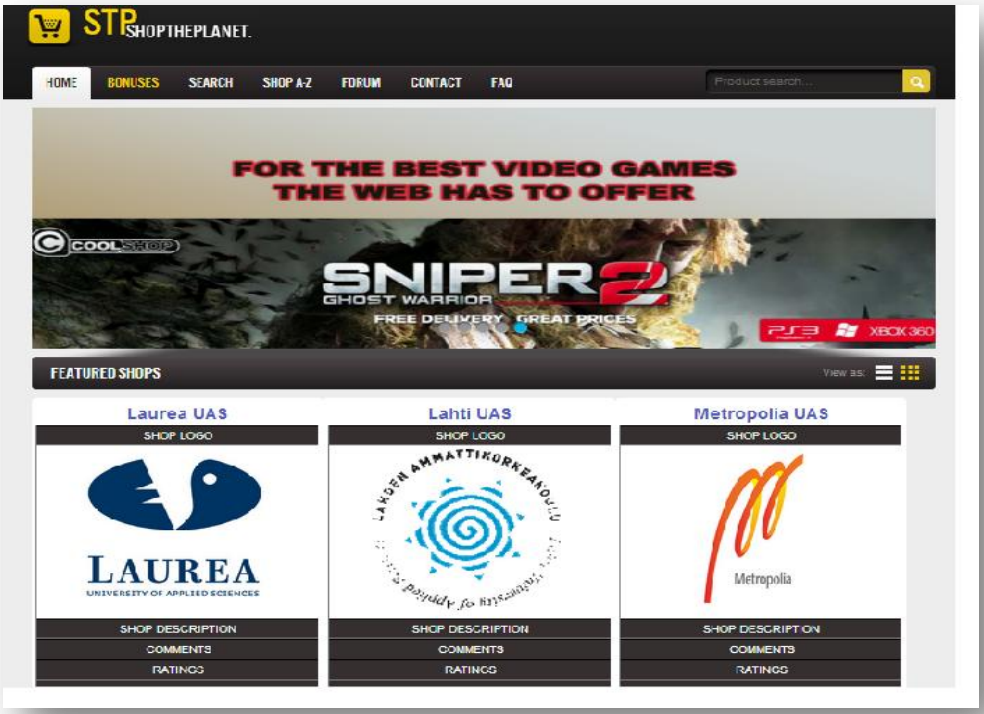

Figure 14: ShopThePlanet main page

ShopThePlanet website is the main part of this project. Except content management objective, which was achieved with implementing control panel, rests of the objectives are achieved within this website by providing 2 types of filtering and a page where users are able to view each shops detail.

4.2.1 Filter system

The website offers 2 different filtering in order to provide better search results to its users and help them to find what they look for.

a) Category filtering

In this filtering option users choose their criteria for the shop that they are interested in viewing, and as result filtering system returns the list of the shops from database that matches to user's selected criteria. Users have the ability to filter the shops according to their age groups, currency which shops accept for the transactions, payment methods that shops support, countries that shops offer their service to and several market specific categories.

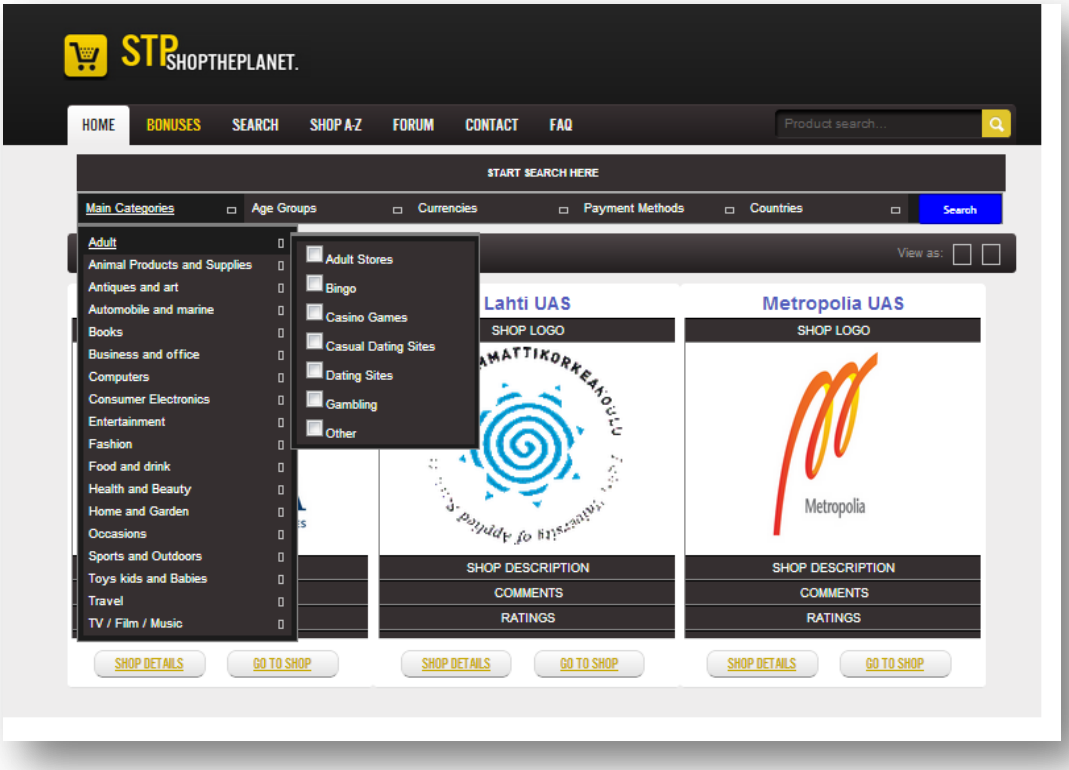

Figure 15: Criteria selection for filtering

b) A to Z filtering

This option offers a filtering based on shops name rather than something they offer in order to help user to find an online shop which they already know its name. Shops are listed on alphabetical order under the title of each letter.

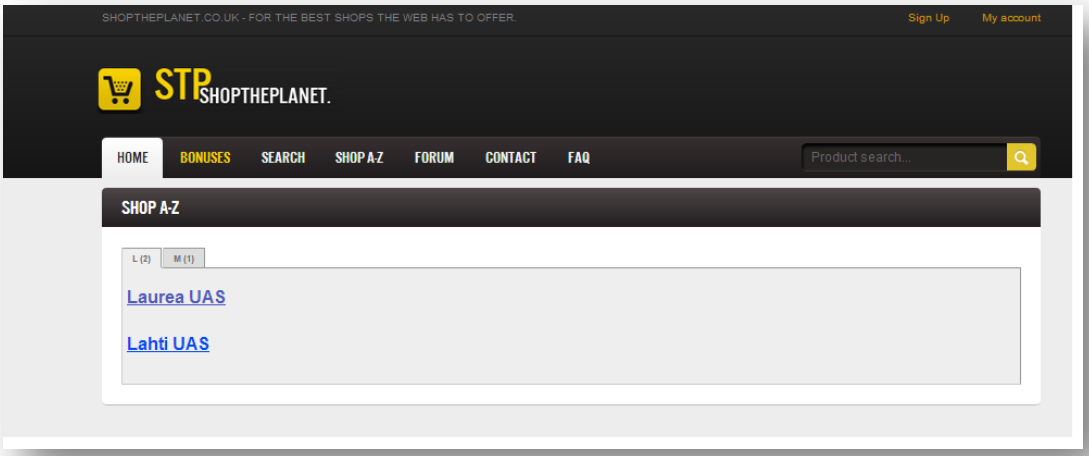

Figure 16: A to Z filtering

4.2.2 Shop details page:

The page provides the information a user may need in order to as certain if they wish to visit the shop. This includes description, a main picture and 4 additional pictures. Implementation of rating system and Facebook comment function is scheduled but implementation depends on the status of the project.

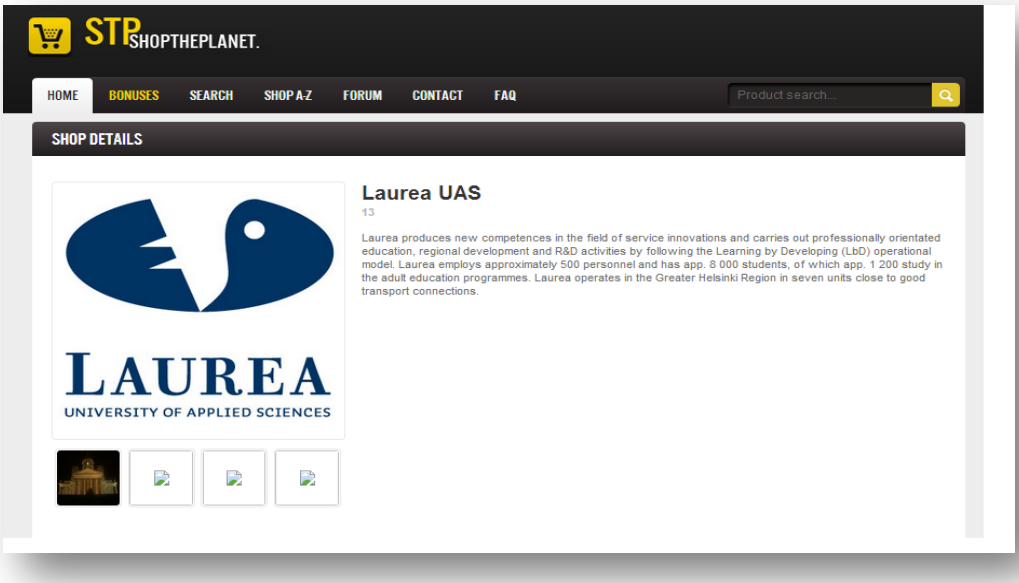

Figure 17: Company detail page

5 Conclusion

Since the project is implemented by a student, the outcome of this project must be analyzed in two parts: the student's development and the project's success.

5.1 Student's development:

As a student my purpose of joining this project was to apply the knowledge that I had gathered during my degree in a real project, possibly to acquire new skills during the implementation and experience a full software development. By the end of project:

- I learned a new framework (ASP.NET MVC) and a server technology (ISS).
- I extended my knowledge on C#, MySQL and HTML.
- I improved my research skills. Where my knowledge was insufficient I conducted research and successfully applied the findings into the project.
- I could not have a full software development experience since the project was not successfully managed and the communication between development teams was not efficient. As a result of this I could only focus on my part of the development rather than taken part in the whole picture.

5.2 Project's success

In real life a project's success is measured according to project's output rather than how it was conducted. According to this approach the thesis project achieved its objectives which were the production of the filter system, shop details content, and content management.

But when it is considered this thesis project was a part of the ShopThePlanet web service project and currently the website being offline, it can be interpreted as signifying that the project outcome failed to satisfy customer's expectation. So, even though all the thesis objectives are delivered and functionally the project was successful, it cannot be regarded as a successful project since the customer decided not to use the web service.

5.3 Recommendations

Since the project team consist of students and considering them being inexperienced, expectations from the project output should have been in similar level.

The only way to get a good outcome from a project which is conducted by an inexperienced team is to manage the project properly. Project management cannot be done with common

sense if the person does not have any experience in project management it has to be studied or done by someone who has experience in project management.
Also project schedule could have been planned and executed better.

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List of Figures

Appendixes

Appendix A – Database tables

a. Company Table

Stores basic data related to each online-shop

Field name	Description
company_id	Primary key - Company id unique for each shop Type: Varchar Size: 100
market_provider_id	Used to categorize shops Type: Varchar Size: 100
company_name	Name of the shop Type: Varchar Size: 500
company_desc	Detailed description of the shop Type: Varchar Size: 2000
company_desc	Summarized description of the shop Type: Varchar Size: 1000
country_origin	Location that the shop is established Type: Varchar Size: 200
activity_status	Current status of the shop's activities(online, pending… etc) Type: Varchar Size: 100
store_status	Current status of the shop in ShopThePlanet (gold, silver… etc) Type: Varchar Size: 100
affiliate_link	URL to the online-shop with affiliate code Type: Varchar Size: 200
image_source	Source of the image that will be used with shop details Type: Varchar

	Size: 500
image_link	URL to online-shop which user will be redirected when picture is clicked. Type: Varchar Size: 500
store_age	Age of the online-shop Type: Integer Size: 11
isrecommended	Used to define whether the shop is recommended Type: Boolean Size: 10
status	This is the status of the data which will be used for logically deleting (1-valid, 2-deleted, 3-archived) Type: Integer Size: 11

b. Age_group Table

Defines the age groups that will be used for filtering

Field name	**Description**
agegroup_id	Primary key - id of the age group Type: Integer (auto increment) Size: 10
agegroup_name	Name of the age group Type: Varchar Size: 100
status	This is the status of the data which will be used for logically deleting (1-valid, 2-deleted, 3-archived) Type: Integer Size: 11

c. Country Table

Defines the countries where a shop can offer shipment.

Field name	**Description**
country_id	Primary key - id of the country Type: Integer (auto increment) Size: 10
country_name	Name of the country Type: Varchar

	Size: 100
status	This is the status of the data which will be used for logically deleting (1-valid, 2-deleted, 3-archived) Type: Integer Size: 11

d. Currency Table

Defines valid currencies will be used for purchases.

Field name	**Description**
currency_id	Primary key - id of the currency Type: Integer (auto increment) Size: 10
currency_name	Name of the currency Type: Varchar Size: 100
status	This is the status of the data which will be used for logically deleting (1-valid, 2-deleted, 3-archived) Type: Integer Size: 11

e. Main_category Table

Defines valid main categories will be used for filtering.

Field name	**Description**
category_id	Primary key - id of the category Type: Integer (auto increment) Size: 10
category_name	Name of the currency Type: Varchar Size: 200
status	This is the status of the data which will be used for logically deleting (1-valid, 2-deleted, 3-archived) Type: Integer Size: 11

f. Payment_method Table

Defines valid payment methods will be used for purchases.

Field name	Description
method_id	Primary key - id of the payment method Type: Integer (auto increment) Size: 10
method_name	Name of the payment method Type: Varchar Size: 200
status	This is the status of the data which will be used for logically deleting (1-valid, 2-deleted, 3-archived) Type: Integer Size: 11

g. Sub_category Table

Defines valid sub categories will be used for filtering.

Field name	Description
subcategory_id	Primary key - id of the subcategory Type: Integer (auto increment) Size: 10
parent_id	Foreign key - id of the parent(main) category Type: Integer Size: 10
subcategory_name	Name of the subcategory Type: Varchar Size: 200
status	This is the status of the data which will be used for logically deleting (1-valid, 2-deleted, 3-archived) Type: Integer Size: 11

h. Company_agegroup Table

Join table (m:n) where age groups for companies are defined

Field name	Description
company_id	Foreign key - Id of the company Type: Varchar Size: 100

agegroup_id	Foreign key - Id of agegroup Type: Integer Size: 10
status	This is the status of the data which will be used for logically deleting (1-valid, 2-deleted, 3-archived) Type: Integer Size: 11

i. Company_category Table

Join table (m:n) where main categories for companies are defined

Field name	**Description**
company_id	Foreign key - Id of the company Type: Varchar Size: 100
maincategory_id	Foreign key - Id of main category Type: Integer Size: 10
status	This is the status of the data which will be used for logically deleting (1-valid, 2-deleted, 3-archived) Type: Integer Size: 11

j. Company_currency Table

Join table (m:n) where currencies that companies used for purchases are defined

Field name	**Description**
company_id	Foreign key - Id of the company Type: Varchar Size: 100
currency_id	Foreign key - Id of currency Type: Integer Size: 10
status	This is the status of the data which will be used for logically deleting (1-valid, 2-deleted, 3-archived) Type: Integer Size: 11

k. Company_deliver_country Table

Join table (m:n) where countries that shops offers shipment are defined.

Field name	Description
company_id	Foreign key - Id of the company Type: Varchar Size: 100
country_id	Foreign key - Id of country Type: Integer Size: 10
status	This is the status of the data which will be used for logically deleting (1-valid, 2-deleted, 3-archived) Type: Integer Size: 11

l. Company_payment_method Table

Join table (m:n) where countries that shops offers shipment are defined.

Field name	Description
company_id	Foreign key - Id of the company Type: Varchar Size: 100
paymentmethod_id	Foreign key - Id of payment method Type: Integer Size: 10
status	This is the status of the data which will be used for logically deleting (1-valid, 2-deleted, 3-archived) Type: Integer Size: 11

m. Company_category Table

Join table (m:n) where sub-categories for companies are defined

Field name	Description
company_id	Foreign key - Id of the company Type: Varchar Size: 100

subcategory_id	Foreign key - Id of sub-category Type: Integer Size: 10
status	This is the status of the data which will be used for logically deleting (1-valid, 2-deleted, 3-archived) Type: Integer Size: 11